PATENT ABSTRACTS OF JAPAN

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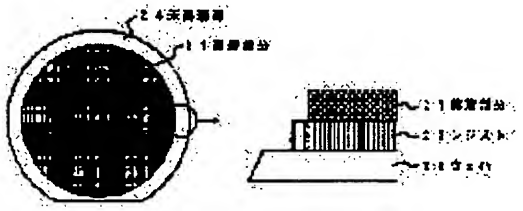
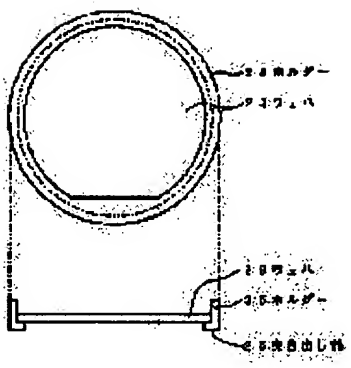
(54) VAPOR DEPOSITION APPARATUS AND METHOD FOR FORMATION OF METAL PATTERN

(57)Abstract:
PURPOSE: To facilitate a lift-off, to improve yield of an element and a circuit and to shorten a time of the lift-off and the amount of solvent by eliminating direct adherence of deposited metal to a board at the periphery of a wafer.
CONSTITUTION: After a resist pattern is formed on a wafer 23, an undeposited part 24 is provided 1mm or more from the end of the wafer 23 on the entire periphery of the wafer 23 by a holder 25, a deposition preventing jig, etc., at the time of vapordepositing. Thus, vapor deposition is so conducted as not to adhere the deposited metal to the side of the wafer 23. In this case, since a deposited film 21 on the periphery of the wafer 23 is completely floated from resist 22, the resist 22 is easily dissolved, using amount and time of the solvent can not only be conserved, but also a forcible removal such as spraying is not necessarily conducted, and hence the wafer 23 having a clean removing surface can be obtained to expect to improve a yield.





LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

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* NOTICES *

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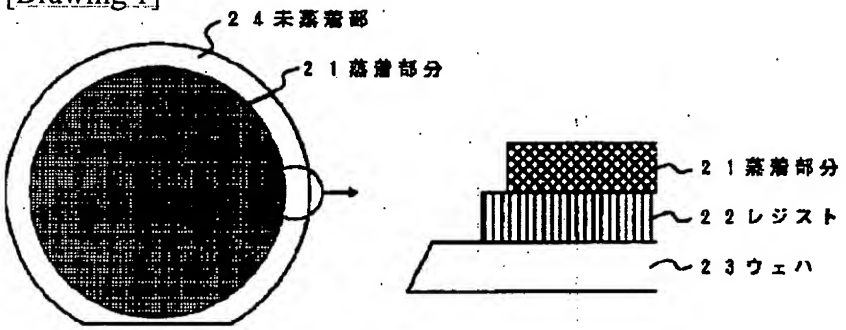
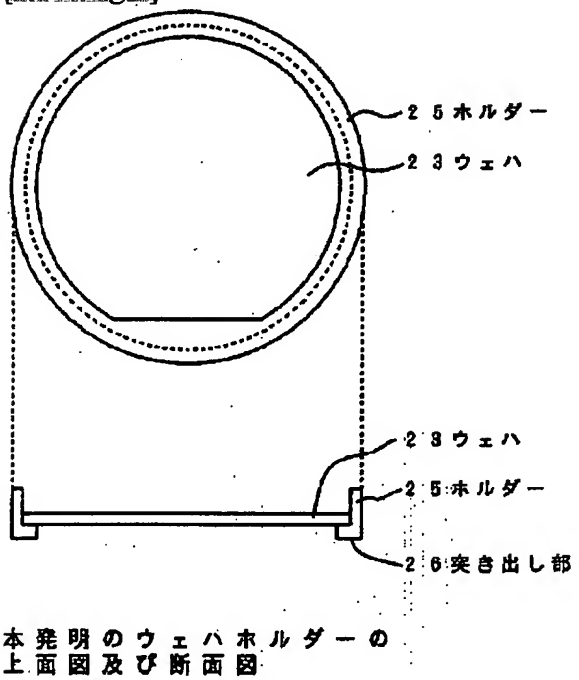
DRAWINGS

[Drawing 1]



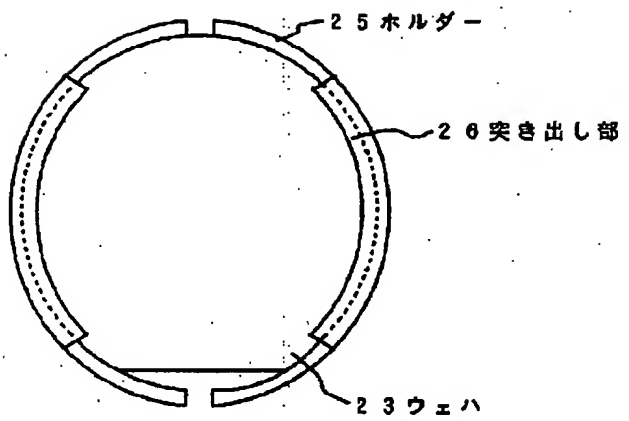
本発明の蒸着法による蒸着膜形成状況、ならびにウェハ側面断面図

[Drawing 2]



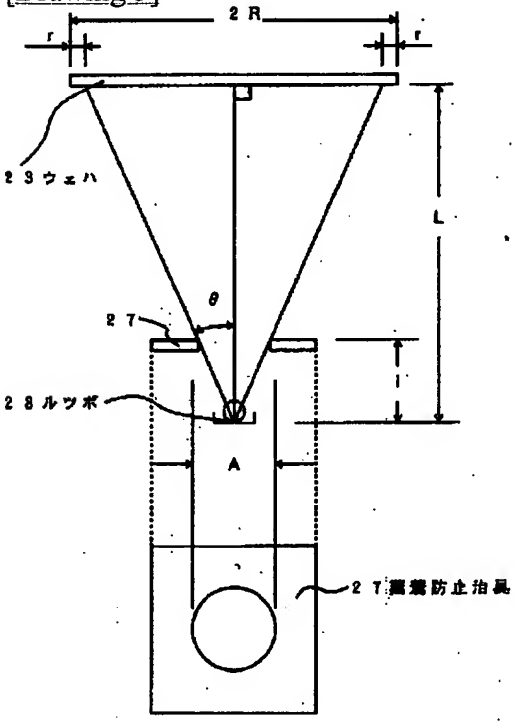
本発明のウェハホルダーの上面図及び断面図

[Drawing 4]



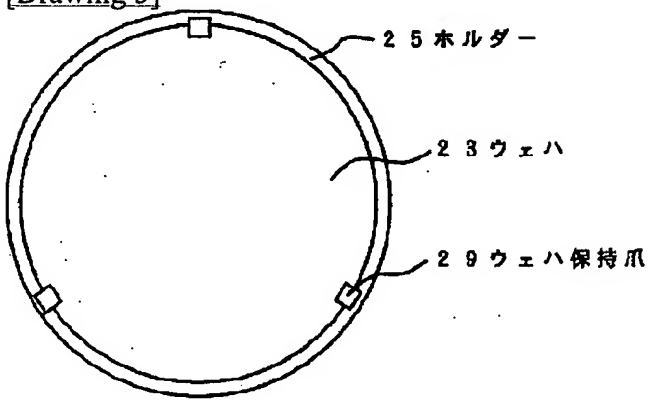
従来のウェハホルダー例

[Drawing 3]



本発明の固着防止治具の
設置場所に関する概成図

[Drawing 5]



従来のウェハホルダー例

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CLAIMS

[Claim(s)]
[Claim 1] Vacuum evaporationo equipment for metal pattern formation characterized by preparing a wrap wafer electrode holder for 1mm or more from the wafer edge of a wafer vacuum evaporationo side so that the non-vapor-deposited section 1mm or more can be prepared to a wafer edge when holding a wafer to vacuum evaporationo equipment.
[Claim 2] Vacuum evaporationo equipment for metal pattern formation characterized by preparing an open beam vacuum evaporationo prevention fixture for the hole of magnitude which obtains the non-vapor-deposited section 1mm or more to all wafer edges in the vacuum evaporationo prevention fixture installed between the source crucible of vacuum evaporationo, and a wafer maintenance electrode holder.
[Claim 3] The vacuum evaporationo approach for metal pattern formation characterized by preparing the non-vapor-deposited section containing the wafer exposed surface of the perimeter of a wafer edge in the vacuum evaporationo for forming an electrode, wiring, etc. by the lift-off method.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the vacuum evaporationo equipment for metal pattern formation and the vacuum evaporationo approach which are characterized by the vacuum evaporationo film of an unnecessary part being easily removable at the time of a lift off.
[0002]
[Description of the Prior Art] The lift-off method is the approach of forming a pattern on a wafer at the resist which is easy to melt into a solvent, and removing a unnecessary metal with the resist after metal vacuum evaporationo to this wafer, and forming an electrode, wiring, etc. By the way, in order that the wafer circumference may maintain resist spreading homogeneity, the shape of a taper of beveling 1mm or more is usually given, and the field is not covered by the resist. Moreover, in order to prevent resist scattering which usually starts on the dust prevention for the improvement in the yield in LSI manufacture at the time of contact of a wafer, a carrier, etc., the resist of the field 1mm or more of the wafer circumference is removed.
[0003] Drawing 4 and drawing 5 show the example of the conventional wafer electrode holder, and drawing 6 shows the sectional view of a wafer side-face holdfast to an example of the formation situation of the vacuum evaporationo film by the conventional vacuum evaporationo approach, and a list.
[0004] In case it vapor-deposits to such [conventionally] a wafer, since it is held at the electrode holder as shown in drawing 4 and drawing 5 , in a field without the resist of the wafer circumference, a vacuum evaporationo metal membrane adheres to a substrate directly (drawing 6).
[0005] In case an electrode is formed by the lift-off method in such a wafer, since the resist of a metal adhesion part is covered with the metal, a solvent does not sink into a resist easily around this wafer.
[0006] For this reason, in order to remove the metal of this field, the spray of a high pressure etc. must perform compulsorily.
[0007] However, since a lot of metal pieces dispersed all over a wafer and adhered in this approach, it had the fault leading to yield lowering of a component and a circuit. Furthermore, the lift off took time amount and there was a fault of using a lot of solvents.
[0008]
[Problem(s) to be Solved by the Invention] It aims at offering the vacuum evaporationo equipment for metal pattern formation and the vacuum evaporationo approach of this invention being able to make a lift off easy by preventing vacuum evaporationo metal adhesion adhering to a direct substrate in a wafer periphery, and improving the yield of a component and a circuit, and considering few quantification of a solvent as compaction of the time amount in the case of a lift off.
[0009]
[Means for Solving the Problem] The configuration of this invention is as being shown below. Namely, when this invention holds a wafer to vacuum evaporationo equipment, It is what has a configuration as vacuum evaporationo equipment for metal pattern formation characterized by preparing a wrap wafer electrode holder for 1mm or more from the wafer edge of a wafer vacuum evaporationo side so that the non-vapor-deposited section 1mm or more can be prepared to a wafer edge. Or it has a configuration as vacuum evaporationo equipment for metal pattern formation characterized by preparing an open beam vacuum evaporationo prevention fixture for the hole of magnitude which obtains the non-vapor-deposited section 1mm or more to all wafer edges again in the vacuum evaporationo prevention fixture installed between the source crucible of vacuum evaporationo, and a wafer maintenance electrode holder. Furthermore, this invention has a configuration as the vacuum evaporationo approach for metal pattern formation

characterized by preparing the non-vapor-deposited section containing the wafer exposed surface of the perimeter of a wafer edge again in the vacuum evaporationo for forming an electrode, wiring, etc. by the lift-off method.
[0010]
[Example] By preparing the non-vapor-deposited section 1mm or more from all wafer edges on a wafer periphery with an electrode holder, a vacuum evaporationo prevention fixture, etc. after forming a resist pattern on a wafer in the example of the first invention at the time of vacuum evaporationo, drawing 1 vapor-deposited so that a vacuum evaporationo metal might not adhere to a wafer side face. Although clearance of a unnecessary metal is performed by melting a resist with a solvent, in this case, since the vacuum evaporationo film of the wafer circumference has floated thoroughly on the resist, a resist melts easily, and since it is not necessary to perform compulsive clearance by a spray etc., it can obtain the beautiful wafer of a clearance side, and it not only can save the amount used and time amount of a solvent, but can expect the improvement in the yield.
[0011] Drawing 2 is an example of the wafer electrode holder of the second invention. In order to obtain the non-vapor-deposited section around a wafer, it is characterized by having a toe wall 1mm or more. Moreover, although vacuum evaporationo is generally turning the vacuum evaporationo side down for the improvement in the yield in case a wafer is subsided in an electrode holder, in such vacuum deposition, this toe wall plays the role of wafer maintenance.
[0012] Drawing 3 shows the installation between the vacuum evaporationo prevention fixture of the third invention, a wafer maintenance electrode holder, and the source crucible of vacuum evaporationo. As for the relation with the magnitude (A) of an installation (l) and the hole of a vacuum evaporationo prevention fixture, a degree type is realized.
[0013]
[Equation 1]

$$l = \frac{A \cdot L}{2\,(R - r)}$$

[0014]
l: The installation of a vacuum evaporationo prevention fixture (distance from a crucible)
A: magnitude L: of the hole of a vacuum evaporationo prevention fixture -- distance R: from a crucible to a wafer core -- radius r:wafer top the non-vapor-deposited section of a wafer [0015]
[Effect of the Invention] As explained above, according to this invention, it sets to manufacture an electrode, wiring, etc. by the lift-off method, the lift off of a vacuum evaporationo metal does not come out as much as possible easily, and the yield of a component and a circuit is improved, and few quantification of compaction of the time amount in the case of a lift off and a solvent can be realized.

[Translation done.]